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Canada, Mines, Bureau of Explosives
Division

CANADA

DEPARTMENT OF MINES AND RESOURCES

HON. T. A. CRERAR, MINISTER; CHARLES CAMSELL, DEPUTY MINISTER

ANNUAL REPORT

OF THE

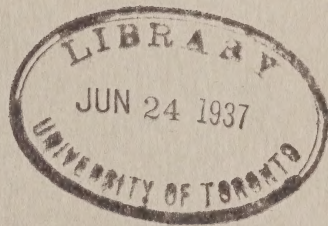
EXPLOSIVES DIVISION

OF THE

BUREAU OF MINES

FOR THE CALENDAR YEAR

1936




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ANNUAL REPORT
OF THE
EXPLOSIVES DIVISION OF THE BUREAU OF MINES
FOR THE CALENDAR YEAR 1936

BY
F. E. Leach

The following report deals with the administration of the Explosives Act during the year ending December 31, 1936.

STAFF

On the first of November, Lieut.-Colonel G. Ogilvie, Chief Inspector of Explosives, was transferred to the Department of National Defence to perform certain specialized duties; and for the present his work in the Explosives Division is being carried out by F. E. Leach.

MANUFACTURE OF EXPLOSIVES

The list of licensed factories, with their locations, will be found in Appendix A. It will be noted that nine factories are in operation, the same number as in the previous year.

Inspectors of the Division made twenty visits of inspection to factories during the year, and found that operations were being carried out in a careful and satisfactory manner. Several changes in manufacturing processes and relocation of buildings contemplated by manufacturers were approved. These changes were covered by amending licences or incorporated in licences on renewal.

The production of explosives, as given in Appendix B, again shows an increase, being about 14.75 per cent in excess of the 1935 production.

The production of explosives has steadily increased during the past few years, owing principally to greater activity in mining, and the year's output of nearly 28,000 tons of explosives of the first four classes is a record since the establishment of the Explosives Division.

ACCIDENTS IN FACTORIES

No accidents in factories occurred during the year, other than a small fire in a building where roman candles were being filled. No personal injuries were caused and the property damage was very slight.

MAGAZINES

At the end of the year there were 592 licensed magazines in use, of which 368 were permanent and 224 temporary.

Deteriorated explosives to the amount of 2,900 pounds found in seventeen different places of storage by inspectors of the Division were condemned and destroyed. The large amount of explosives found in this condition was due largely to the sudden closing down of road construction camps and consequent impossibility of using up stocks that had been purchased when it was expected that the work would continue. In one case a magazine was overwhelmed by a snowslide and the stock was only recovered when the snow melted some months later.

When road improvement work is being carried on over a considerable continuous mileage, it has been found in many cases to be advantageous to concentrate the storage of explosives in one central magazine, and to issue to each separate camp only as much explosives at a time as will suffice for a day's needs. In this way the engineer in charge can keep a close check on the amount of explosives used, and, as far as his own inspection is concerned, he has a much better control of stock than would be the case if there were a number of magazines scattered over the district.

Inspectors of the Division made 411 inspections of magazines, and 235 visits were made by deputy inspectors of the Royal Canadian Mounted Police. This force has been of great assistance to the Division in carrying on inspections in remote districts in the Northwest Territories and the Yukon. Inspections in the Great Bear Lake district were carried out by a Deputy Inspector of Explosives of the Lands, Parks and Forests Branch.

A magazine was destroyed by fire with its contents, some 41 pounds of dynamite and 2,642 feet of safety fuse. There was no explosion, and the origin of the fire is unknown.

THEFTS OF EXPLOSIVES

Seventeen magazines were broken into and approximately 1,370 pounds of dynamite, 7,264 detonators and 1,200 feet of safety fuse were stolen. Of this quantity 45 pounds of dynamite were recovered by the police. A further recovery of 100 pounds of dynamite and 500 detonators, which was part of a theft reported in 1935, was made. In this case three men were arrested, tried, and sentenced to terms of imprisonment. Of the seventeen magazines illegally entered only five were under temporary licence, the others being all of substantial construction and under close supervision. One magazine was broken into three times within four months, and on each occasion explosives were stolen. Thefts from unlicensed premises, subject to regulation under the Explosives Act, amounted to 173 pounds of dynamite, 739 detonators and 150 feet of safety fuse, stolen from seven stores.

EXPLOSIVES ABANDONED

Explosives to the amount of 614 pounds of dynamite, 315 detonators, 365 feet of safety fuse, and 38 ounces of liquid nitroglycerine were found in twenty-five different places, some of them strange ones. In a rooming-house washroom, detonators, fuse, and a phial of nitroglycerine were discovered, and in the bathroom of a hotel five sticks of dynamite. On two

occasions a case of dynamite and a burned fuse which had failed to ignite the explosive were found on a tomb, placed there, it is believed, in an attempt to destroy the sepulchre. Five cases of dynamite, part of a theft of ten cases from a mine magazine in the vicinity, were found hidden in the bush. A strange case was that of a man who decided to rid his garage of accumulated junk, including an old cookstove that could not easily be moved. The easiest way to dismantle it was with a sledge hammer. Several pieces were broken off in this manner until the firepot was reached. As he raised the hammer to break this up he was horrified to see a stick of dynamite roll out on to the floor. Further investigation revealed four more sticks of dynamite, 100 detonators, and 100 feet of fuse. These were taken away by the police and destroyed. After a daring hold up, police were searching premises which had been occupied by criminals and found seventeen sticks of dynamite, detonators and fuse, and a bottle containing 26 ounces of nitroglycerine. Five sticks of dynamite were found by children in a pile of ashes at the back of their house. A box containing 45 pounds of dynamite, found near a quarry, turned out to be the remains of a case stolen from the quarry magazine. In an unoccupied house seventeen sticks of dynamite were found by a man checking the meter. They had been left there by a previous tenant. A fire department inspector found 75 pounds of an unauthorized explosive when he was inspecting a house for fire hazards. The owner was fined and the explosive destroyed.

While stoking his furnace a man noticed a piece of fuse among the coal. On investigation he discovered a primed stick of dynamite. On unloading a carload of coke six sticks of dynamite were discovered. Men fighting a bush fire came across a cache of seven sticks of dynamite. Boys retrieving wood, salvage from a flood, picked up a parcel from a large cake of ice. It contained seventy-five sticks of dynamite.

Small findings such as these are unfortunately recurrent, but some satisfaction may be derived from the fact that no further cache of considerable quantity, too often a dangerous relict of exploration, has been discovered.

UNLICENSED PREMISES

In general the regulations governing the storage of ammunition and small quantities of explosives by merchants and others have been well observed, and it is very rarely that recourse has had to be taken to the law to enforce compliance. Where ammunition and explosives are kept for sale to the public the vendor is required to keep records of all transactions involving the sale of explosives, and of ammunition other than 0.22 calibre and shotgun shells. This is now well understood to be a necessary police measure and these records have many times been of the greatest value as corroborative evidence in criminal cases. Inspectors of this Division made 785 visits of inspection to unlicensed premises, and 2,205 were made by deputy inspectors of the Royal Canadian Mounted Police. It is seldom that any difficulties are encountered in these visits, but it has been found desirable to repeat them at fairly frequent intervals in order to impress upon the owners the fact that the regulations have not been slackened.

IMPORTATIONS

The quantities of explosives, and the various classes, imported during the year are given in Appendix C. The issue of importation permits numbered 475, and of special importation permits 34, an increase of 34 in all over last year. There is a general increase in imports, particularly in nitro cotton used in the manufacture of lacquers, and in nitro compounds used in the making of explosives, but a decided decrease is seen in the amount of liquid nitro compounds imported for use in the oil fields.

AUTHORIZATION OF EXPLOSIVES

Fourteen new explosives were presented for authorization and were examined chemically and physically. Of this number, four were accepted and manufacture authorized. Changes in composition were authorized in the case of four others. Check examinations were made of nine high explosives.

Nineteen new fireworks were submitted for authorization, of which twelve were rejected for various reasons, such as the emission of poisonous fumes, fire hazard, or violence of explosion. The Dominion Analyst in Vancouver made 205 check examinations of imported fireworks, and 137 were made in Ottawa of shipments to ports of entry in eastern Canada. In 71 cases, it was found that shipments or parts of shipments were not in accordance with the terms of the importation permits, and entry was consequently refused.

PROSECUTIONS

Proceedings were taken in thirteen cases for violation of the provisions of the Explosives Act. In one, a charge of theft from a licensed magazine, stay of proceedings was entered, while a second, theft from a temporary magazine, is still pending. Convictions were obtained in the others, and fines or terms of imprisonment were imposed, the offences being:

- Unlawful possession of explosives.
- Careless keeping of explosives.
- Exceeding quantity of explosives allowed by licence.
- Conveying explosives in car with passengers.
- Leaving truck, with load of explosives, unattended in a city.
- Careless stowing of explosives on a truck.
- Theft of explosives from magazines.
- Theft of explosives from truck, man thought it was liquor.

ACCIDENTS

Although the total number of accidents during the year is very nearly the same as in 1935, there is a gratifying decrease in the number of fatalities. In this connexion it is worthy of note that there were fewer fatal accidents during the past year than in 1919 when the Explosives Act began functioning, although the production of explosives has doubled since that time.

A summary of the accidents, classified according to their probable causes, is given in Appendix D. Those due to playing with detonators and other explosives are also given in more detail. It is sad to note the regularity with which these accidents occur; a child finds a detonator, plays

with it, and receives serious and probably permanent injuries. It is a matter which should receive the serious attention of all users of explosives and those responsible for their safe keeping.

The rate of burning of safety fuse is still frequently misjudged, and there is quite a widespread misconception that it burns "a foot a minute." How dangerous such an idea may be is readily understood when the fuse used may burn at double that rate, so that the shot-firer may have at his disposal only half the time on which he counts. It is good practice to ascertain the rate of burning of the particular fuse used by making tests of several measured lengths. Estimates of the length of time which elapses between the lighting of a fuse and the explosion of the charge are subject to great variation. An inspector of mines investigating an alleged case of defective fuse asked four men to state from a given instant when they thought a three-minute interval had elapsed. The times estimated at three minutes actually varied from 18 seconds to 1 minute. One common cause of accidents is delaying too long at the face when spitting shots. This is likely to happen in wet mines where delay is caused by water dropping on the end of the fuse. Another all too frequent cause of serious and fatal accidents is boring into unexploded charges.

A bolt of lightning set off a charge prematurely by travelling down a steel cable and igniting the fuses. The miner making ready the blast was killed and a second miner was injured by flying rock. A miner was carrying two detonators in his hand with which he was going to prime cartridges in the mine. When he tripped and fell the detonators in his hand struck a rod and exploded, causing severe injuries to his hand. Two miners were driving levels towards each other and neither realized how close the faces were to meeting. A shot fired by one party broke through the opposite face and injured one miner. Four accidents were caused by miners walking into unguarded runways where blasting operations were being carried on. In an industrial plant a pile of frozen coal was being broken up with explosives and fed into a crusher. A stick of dynamite fell into the hopper and the resulting explosion injured a man's eyes. While engaged in tearing down a building, a man caused the explosion of some detonators which he carried in his pocket. His injuries proved fatal, while another workman received minor injuries. A workman was testing a detonator which exploded and he received lacerations and burns. Two men were digging a well, using explosives; they set a charge and retired to safety when they noticed a child approaching the well; both men rushed over to save the child, when within two yards of the well the shot blew and injured them both. A logger was killed when dynamiting a log jam, but the cause of this accident is unknown. A well digger went into a field to destroy two sticks of dynamite left over after drilling a well. He was killed by an explosion, the cause of which has not been determined. An accident occurred in a mine magazine whereby one man was killed and another injured. The cause has not been determined with certainty but it is believed the deceased entered the magazine with a naked light.

APPENDIX A

Factories Licensed to Manufacture Explosives in 1936

| Owner | Location of factory | General nature of product | Remarks |
|------------------------------------|------------------------|--|-------------------------|
| Canadian Industries, Ltd..... | Beloeil, Que..... | Blasting explosives, black powders, propellants. | Operation intermittent. |
| Canadian Industries, Ltd..... | James Island, B.C.. | Blasting explosives, black powders. | |
| Canadian Industries, Ltd..... | Nobel, Ont..... | Blasting explosives. | |
| Canadian Industries, Ltd..... | Brainerd, Man..... | Blasting explosives. | |
| Canadian Industries, Ltd..... | Brownsburg, Que.... | Ammunition, detonators, etc. | |
| Canadian Safety Fuse Co..... | Brownsburg, Que.... | Safety fuse. | |
| T. W. Hand Fireworks Co., Ltd. | Dixie, Ont..... | Fireworks. | |
| B. Marroni..... | Ville St. Pierre, Que. | Fireworks..... | |
| Macdonald Metal Products Co., Ltd. | Waterloo, Que..... | Toy pistol caps. | |

APPENDIX B

Production of Explosives in Canadian Factories During the Year 1936

| | Quantity |
|---|--------------------------|
| Class I. Gunpowder..... | 30,637 lb. |
| “ II. Nitrate mixtures..... | 1,626,900 “ |
| “ III. Nitro-compounds— | |
| “ Division 1..... | 54,115,050 “ |
| “ VI. *Ammunition— | |
| Division 1— | |
| Safety cartridges..... | 103,055,445 |
| Safety fuse..... | Output of one factory. |
| Railway torpedoes..... | Output of one factory. |
| Percussion caps..... | Output of one factory. |
| Division 3— | |
| Detonators and electric detonators..... | Output of one factory. |
| “ VII. Fireworks— | |
| Division 2— | |
| Commercial and display fireworks, fuse lighters, toy caps and railroad signals. | (approx. value) \$95,620 |

*Exclusive of artillery ammunition but includes small arms ammunition made in Government factories.

APPENDIX C

Explosives Imported Into Canada, January 1 to December 31, 1936

| Class | Division | Description | Quantity |
|-------|----------|--|--------------|
| I | | Gunpowder..... | 113 lb. |
| II | | Nitrate mixtures..... | 2,400 " |
| III | 1 | Mixtures containing liquid nitro-compound..... | 16,405 " |
| | 2 | Nitro-compounds:— | |
| | | (a) Propellants..... | 130,268 " |
| | | (b) For use in explosives factories..... | 276,110 " |
| | | (c) For other manufacturing purposes..... | 1,203,018 " |
| V | 1 | Fulminate of mercury..... | 2,000 " |
| VI | 1 | Percussion caps..... | 1,035,200 |
| | | Safety fuse..... | 1,000 feet |
| | 2 | Miners' squibs..... | 155,000 |
| | | Detonating fuse..... | 336,636 feet |
| | 3 | Detonators and electric detonators..... | 310,000 |
| | | Fuses (whaling)..... | 314 |
| VII | 2 | Manufactured fireworks..... | 390,000 lb. |

APPENDIX D

Accidents from Explosives during the Calendar Year 1936

| Circumstances or Cause | Mines and Quarries | | | Elsewhere | | | Total | | |
|--|--------------------|--------|---------|-----------|--------|---------|-----------|--------|---------|
| | Number of | | | Number of | | | Number of | | |
| | Accidents | Killed | Injured | Accidents | Killed | Injured | Accidents | Killed | Injured |
| In Use— | | | | | | | | | |
| (a) Prematures, and failing to get away from the shot hole. | 24 | 5 | 30 | 6 | 3 | 3 | 30 | 8 | 33 |
| (b) Firing by electricity when persons are at the shot hole. | 4 | ..... | ..... | 2 | ..... | 4 | 2 | ..... | 4 |
| (c) Not taking proper cover..... | 6 | ..... | 4 | 5 | ..... | 5 | 9 | ..... | 9 |
| (d) Projected debris..... | 6 | ..... | 6 | 10 | 2 | 8 | 16 | 2 | 14 |
| (e) Hangfires, and returning too soon to shot hole. | 16 | 5 | 15 | 4 | 1 | 3 | 20 | 6 | 18 |
| (f) Tampering with misfired shots..... | 1 | ..... | 1 | ..... | ..... | ..... | 1 | ..... | 1 |
| (g) Ramming or stemming the charge..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 |
| (h) Sparks, flame, etc..... | 2 | 4 | 1 | 1 | ..... | 1 | 1 | ..... | 1 |
| (i) Boring into unexploded charge..... | 16 | 3 | 23 | 2 | ..... | 2 | 18 | 4 | 1 |
| (j) Striking unexploded charge in removing debris..... | 2 | ..... | 2 | ..... | ..... | ..... | 2 | 3 | 25 |
| (k) Preparing charges..... | 1 | ..... | 1 | ..... | ..... | ..... | ..... | ..... | 2 |
| (l) Lighting fuse before inserting charge..... | 2 | ..... | 2 | 2 | 1 | 1 | 3 | 1 | 2 |
| (m) Fumes..... | 2 | ..... | 2 | 1 | ..... | 1 | 3 | ..... | 3 |
| (n) Springing or socketing shots..... | 4 | 1 | 3 | ..... | ..... | ..... | 4 | 1 | 3 |
| (p) Various..... | 9 | 1 | 9 | 2 | ..... | 2 | 2 | ..... | 2 |
| | | | | 7 | 3 | 6 | 16 | 4 | 15 |
| | 87 | 19 | 97 | 42 | 10 | 36 | 129 | 29 | 133 |
| In Manufacture..... | | | | | | | | | |
| In Keeping..... | | | | | | | | | |
| In Conveyance (other than by railway)..... | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | * | | | |
| Miscellaneous— | | | | | | | | | |
| (a) Playing with detonators..... | ..... | ..... | ..... | ..... | ..... | ..... | 26 | 1 | 28 |
| (b) Playing with other explosives..... | ..... | ..... | ..... | ..... | ..... | ..... | 7 | ..... | 8 |
| (c) Various..... | ..... | ..... | ..... | ..... | ..... | ..... | 7 | 1 | 8 |
| | | | | | | ** | 40 | 2 | 44 |
| Totals, all circumstances..... | 87 | 19 | 97 | 42 | 10 | 36 | 169 | 31 | 177 |

*Except for these, accounts of which are given in the text, the accidents given in this table occurred in circumstances not directly controlled by the Act.

**Circumstances are given on next page.

APPENDIX D—Continued

Playing With Detonators

| Cause of Accident | Killed | Injured |
|---|--------|---------|
| Boy, age 11, picked up detonator in barn and gave it to his younger sister to hold while he applied a light. Each lost three fingers, while four other children standing by received minor injuries..... | | 2 |
| Youth, age 17, found a detonator in the street. He tried to open it with a pair of pincers. The injuries he received by the explosion which followed necessitated the amputation of two fingers of his right hand..... | | 1 |
| Youth, age 20, found a detonator in a farm garage and not knowing its properties laid it on a block and struck it with a piece of wood. He lost the thumb and index finger by the explosion..... | | 1 |
| Boy, age 12, was given a detonator by a companion who found some under a tool shed in school. He applied a light to it, and lost thumb and two fingers of his left hand by the explosion..... | | 1 |
| Boy, age 11, found a detonator near his house. He threw it on the stove. The resulting explosion tore away his thumb and mutilated the other fingers of his right hand..... | | 1 |
| Two boys found detonators in a nearby quarry and tossed them into a bonfire. They were injured about the eyes and knees when they exploded..... | | 2 |
| Boy, age 11, was given a detonator by a companion who found 14 near a greenhouse. He tried to ignite it with a match. He lost thumb and two fingers of left hand by the explosion which followed..... | | 1 |
| Boy, age 8, found a detonator while playing in his uncle's yard. He tried to remove the composition to make a whistle. He lost his left hand and received injuries to his left eye when it exploded..... | | 1 |
| Boy, age 15, found six detonators in an old house. He successfully removed the composition from one and ignited it, concluding that they were no good he flung the remainder into the kitchen stove. They exploded. He lost thumb and index finger of his right hand..... | | 1 |
| Youth, age 17, tried to cut a detonator with a knife. He received severe injuries to stomach, hands, and face when it exploded..... | | 1 |
| Youth, age 21, attempted to open a box of detonators with a file when it exploded. His young sister, age 10, was approaching him. The youth died of injuries, the girl was removed to hospital for treatment..... | 1 | 1 |
| Boy, age 7, found a fused detonator and tried to cut it with a butcher knife. He suffered injuries to his legs, nose, and left eye..... | | 1 |
| Boy, age 7, found a detonator and applied a match to it. He lost the tips of three fingers when it exploded..... | | 1 |
| Girl, age 8, applied a light to a detonator in her home. She lost two fingers and thumb of left hand by the explosion..... | | 1 |
| Boy, age 7, found a box of detonators in the pig pen on his father's farm. He struck one with a stone. It exploded. He lost two fingers and thumb of left hand..... | | 1 |
| Youth, age 17, found a detonator in a disused gravel pit, not knowing its nature scratched it with a nail. He lost three fingers and one eye by the explosion which followed..... | | 1 |
| Boy, age 13, while looking for nails found a box of detonators. To open the box he threw it on the floor. He lost the sight of one eye by projected metal caused by the explosion which followed..... | | 1 |
| Boy, age 10, found a detonator in an orchard. He placed it on a rock and struck it with a stone. He received lacerations to legs and hand..... | | 1 |
| Boy, age 16, with three other boys entered a shack, used to store telephone equipment, and stole two sticks of blastol and seven detonators intending to carry out Hallowe'en pranks. He applied a match to one of the detonators and lost the thumb and tips of two fingers of left hand by the explosion..... | | 1 |
| Boy, age 9, found a detonator and tried to remove the composition with a knife while in class room. It exploded. He lost two fingers of his left hand..... | | 1 |
| Boy, age 10, found a detonator and exploded it while cutting it with a knife. He lost two fingers and thumb of left hand..... | | 1 |

APPENDIX D—*Concluded*Playing With Detonators—*Concluded*

| Cause of Accident | Killed | Injured |
|--|--------|---------|
| Man found a box of detonators in barn and not knowing the nature of the contents, endeavoured to open it with a hammer. He was taken to hospital unconscious, but escaped serious injury except for burns to face and hands..... | | 1 |
| Man examining a detonator while smoking a cigarette caused it to explode by hot ash dropping on it. He lost thumb and middle finger of left hand..... | | 1 |
| Three accidents of which details are not known occurred when children were playing with detonators:— | | |
| Boy, age 12, severe injuries to left hand..... | | 1 |
| Youth, age 17, lost two fingers and thumb of left hand..... | | 1 |
| Girl lost three fingers and thumb of left hand and injured her eyes..... | | 1 |
| | 1 | 28 |

Playing With Other Explosives

| | | |
|--|--|---|
| Boy, age 15, made some throw-down torpedoes by mixing gunpowder, phosphorus, and other chemicals. While holding two of these in his hand they exploded, severely lacerating his fingers..... | | 1 |
| Boy was severely burned about the arms and legs when a home-made stench-bomb, thrown at him by a companion, exploded..... | | 1 |
| Boy, age 14, mixed ingredients to form gunpowder. The mixture exploded. He received painful injuries to his eyes..... | | 1 |
| Youth, age 17, while experimenting with some gunpowder caused it to explode. He was burned about face and neck, and his body peppered with pieces of metal from the container..... | | 1 |
| Two boys, ages 12 and 11, fired a .303 cartridge by hammering the primer. Both boys were injured about the hands by the explosion..... | | 2 |
| Man while examining a shotshell primer caused it to explode. His eye was injured..... | | 1 |
| Boy, age 12, lit a firecracker and threw it away, when it failed to explode he picked it up and blew on the fuse. It exploded in his face. He received severe burns..... | | 1 |
| | | 8 |

Miscellaneous

| | | |
|--|---|---|
| Man destroying a carton of containers of flashlight powder by drowning, struck carton with iron bar to cause it to sink. The carton exploded. He lost an eye. A companion received minor injuries..... | | 2 |
| Two men while handling a small bottle of flashlight powder let it fall to the floor. One picked it up and gave it a shake when it exploded. Both men suffered burns and cuts..... | | 2 |
| Photographer lost his right hand by explosion of bottle of flashlight powder when preparing to take a photograph..... | | 1 |
| Woman replenished kitchen stove with coal when an explosion shattered the range and blew out nine windows in the house. She received a severe scalp wound..... | | 1 |
| Woman tossed a bag containing powder into her kitchen stove. A sheet of flame which followed burned her face and ignited her clothing..... | | 1 |
| Man, age 43, had a stick of dynamite explode in his hand. He died of injuries. It is believed he was dynamiting fish..... | 1 | |
| Child was struck by burning debris from a grandstand fireworks' display..... | | 1 |
| | 1 | 8 |

APPENDIX E

Authorized Explosives

Explosives manufactured by Canadian firms as hereunder detailed:—

Canadian Industries, Ltd.

Polar dynamite—25, 30, 35, 40, 50, and 60 per cent.
 Polar Mineite—35, 40 per cent.
 Polar Ammonia Dynamite—20, 25, 30, 35, 40, 50, and 60 per cent.
 Polar Stopeite—20, 25, 30, 35, 40, 50, 55, and 60 per cent.
 Polar Gelatinized Dynamite—50, 60, and 75 per cent.
 Polar Forcite Gelatin—30, 35, 40, 50, 60, 75, 80, and 90 per cent.
 Giant Gelatin—20, 25, 30, 35, 40, 50, 60, 75, 80, and 90 per cent.
 Polar Monobels, Nos. 4, 6, 7, and 14.
 Polar CXL-ite No. 2.
 Polar Cilgel.
 Gelatin Dough.
 C. X. L. Special Gelatin No. 1.
 C. X. L. Special Dynamite No. 1, No. 2, and No. 3.
 Polar Stumping No. 1, Extra, and Dominion Stumping No. 1.
 Blastol.
 S. N. G.
 Gypsumite "A," "B," and "C."
 Cordite.
 Black Blasting Powders.
 Black powder pellets.
 Gunpowder.
 Sporting powders.
 Safety fuse powders.
 Safety fuse lighters.
 Signal bombs.

Canadian Safety Fuse Co., Ltd.

Safety fuse—"Clover" brand.
 Safety fuse—"Black Clover" brand.
 Safety fuse—"Beaver" brand.
 Safety fuse—"White Jacket" brand.
 Safety fuse—"Crown" brand.
 Safety fuse—"Moose" brand.
 Safety fuse—"Pacific" brand.
 Fuse lighters.

Canadian Industries, Ltd. (Dominion Ammunition Divn.).

Ammunition.
 Detonators.
 Lead Azide.
 Lead Trinitroresorcinate.
 Percussion caps.
 Railway torpedoes.
 Electric detonators.
 Railway fuses.

All explosives on the British authorized list are provisionally authorized in Canada, and in addition those manufactured by the following firms, as detailed below:—

American Powder Co., Maynard, Mass.
 American, R.C. 22 short.

Atlas Powder Co., Wilmington, Del.

Electric blasting caps, Nos. 6, 7, and 8.

Blasting caps, Nos. 6, 7, and 8.

Nitrocellulose.

Trinitrotoluene.

Brücker and Zinke, Meissen, Germany.

Safety fuse—"Globe" brand.

Brücker and Zehetbsche, Minden, Germany.

Safety fuse—black fuse "Triumph" brand.

Safety fuse—white fuse "Triumph" brand.

California Cap Co., Oakland, Cal.

Detonators.

Central Railway Signal Co., Boston, Mass.

Railway torpedoes.

Railway fusees.

Dumore National Chemical Co., Seattle, Wash.

Regina stumping powder Nos. 1 and 2.

Regina rock powder Nos. 1 and 2.

E. I. Dupont de Nemours & Company, Inc., Wilmington, Del.

Dupont bulk rifle powders (Nos. 80, 92).

Dupont smokeless shotgun powder.

Dupont pistol powders Nos. 5 and 6.

Dupont sporting rifle powders.

Ballistite smokeless shotgun powder.

Improved military rifle powders.

Dupont dense smokeless shotgun powder.

Fulminate of mercury.

Guncotton.

Trinitrotoluene.

Tetryl.

Dynamite and blasting gelatin.

Agritol.

Ensign Bickford Co., Simsbury, Conn.

Cordeau-Bickford fuse.

Pull wire fuse lighters.

Hercules Powder Co., Wilmington, Del.

Bullseye revolver powder.

Hercules smokeless rifle powder.

Hercules smokeless shotgun powder.

Infallible smokeless shotgun powder.

Dynamite and blasting gelatin.

Illinois Powder Manufacturing Co., St. Louis, Miss.

Ammonia dynamite—40 and 60 per cent.

Powdertol No. 1 and No. 3.

Independent Eastern Torpedo Co., Findlay, Ohio.

Nitroglycerine.

King Powder Co., King's Mills, Ohio.

Semi-smokeless powder.

Maison Farman, Billancourt, France.

Farman airplane starting cartridge.

Poudreries Reunies, Brussels.
Safety fuse—"Shamrock" brand.

John R. Powell, Plymouth, Pa.
Miners' squibs.

Safety Mining Co., Chicago, Ill.
Cardox.

Trojan Powder Co., Allentown, Pa.
Trojan blasting CC.
Trojan TL 502.
Trojan 35 per cent standard.
Trojan 40 per cent standard.
Trojan 40C.
Trojan 50C.

United Railway Signal Corporation, Newton, Mass.
Railway torpedoes.

Western Cartridge Co., East Alton, Ill.
Detonators.

Authorized Explosives (Manufactured Fireworks)

Manufactured fireworks on the British authorized list are provisionally authorized in Canada.

All fireworks as manufactured by the following Canadian makers are authorized:

Macdonald Metal Products Company, Ltd., Waterloo, Que.
Marroni, Berardo, St. Pierre, Que.
Toronto Fireworks Co., Ltd., Islington, Ont.
T. W. Hand Co., Ltd., and Dominion Fireworks Co., Dixie, Ont.

Certain fireworks manufactured by the following foreign makers are authorized:

Germany:

Blumberg and Co., Dusseldorf.
Eisfeld, J. F., Silberhutte, Anhalt.
Eckhardt, C. F. Nuernberg.
Fischer, Wilhelm, Worbis, Wurtemberg.
Geb. Weinrich, Worbis, Thuringen.
Gerka Werke, Offenbach on Main.
Hamburg-Bremer Handelgesellschaft, Hamburg.
Nicolaus H. and Co., Memingen, Thuringen.
Trummer and Co., Hamburg.
Wicks, Fred, Barmen.

Japan:

Hirono Shoten, Kobe.

United States:

American Fireworks Co., Boston, Mass.
Antonelli Fireworks Co., Rochester, N.Y.
Backes, M. Sons Inc., Wallingford, Conn.
Burke and James Inc., Chicago.
Central Railway Signal Co., Boston, Mass.

United States—*Concluded*

Continental Fireworks Manufacturing Co., Dunbar, Pa.
 Coston Supply Co., New York.
 Edmiston Manufacturing Co., Columbus, Ohio.
 Edwards Co., Cincinnati.
 Essex Specialty Co., Berkeley Heights, N.J.
 Federal Buster Corporation, Pittsburgh.
 Hitt Fireworks Co. Inc., Seattle.
 International Fireworks Co., New York.
 International Flare Signal Co., Tiptecanoe City, Ohio.
 Jedel, A., Newark, Del.
 Kilgore Manufacturing Co. Inc., Westerville, Ohio.
 Los Angeles Fireworks Co., Los Angeles.
 Marshall, John C., Brooklyn, N.Y.
 National Fireworks Inc., West Hanover, Mass.
 New Jersey Flugent Co., New Brunswick, N.J.
 Norman Willetts Photo Supply Co., Chicago.
 Potts Fireworks Display Co., Franklin Park, Ill.
 Rochester Fireworks Co., Rochester, N.Y.
 Safety Automatic Toy Co., Dayton, Ohio.
 Standard Railway Fusee Corporation, Boonton, N.J.
 Triumph Fusee and Fireworks Co., Elkton, Md.
 Unexcelled Manufacturing Co., Inc., New York.
 Victory Fireworks and Specialty Co., Elkton, Md.

Small Chinese fireworks and Chinese firecrackers with gunpowder composition, and not exceeding four inches in length and nine-sixteenth inch in diameter, are authorized when found to function satisfactorily on examination at port of entry.

OTTAWA
J. O. PATENAUDE, I.S.O.
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1937